

1

**EXERCISE TREADMILL****REFERENCE TO RELATED APPLICATIONS**

The current application claims the benefit of U.S. Provisional Application No. 62/255,383 which was filed on 14 Nov. 2015, U.S. Provisional Application No. 62/329,354 which was filed on 29 Apr. 2016, and U.S. Provisional Application No. 62/351,418 which was filed on 17 Jun. 2016, each of which is hereby incorporated by reference.

**TECHNICAL FIELD**

The present invention pertains to the field of treadmills used for running, walking, and other exercise.

**BACKGROUND ART**

Treadmills are generally built with three main constraints: (1) A frontal rail generally including speed/incline controls; (2) a lack of side rails that extend meaningfully along the longitudinal axis of the treadmill; and (3) consistent belt speed set by the user—which may vary as the user shifts controls or an interval program occasionally (every 1+ minutes, perhaps) alters the speed. The aspects of the front rail and the need to use its controls cause the vast majority of runners to position themselves very close to the front rail to manage the controls, view the media console, and to ensure a sense of safety that they won't fall too far back to the center or rear of the treadmill where there are no supportive rails on one or both sides. The aspect of consistent belt speed also causes runners to drift as they constantly vary their pace, unconsciously favoring acceleration, to maintain a sense of security near the front of the treadmill. Positioned at the front rail, runners compromise form, efficiency and satisfaction. The frontal positioning of the control component and display including speed and distance ran/walked also becomes a visual focal point and distance counting distraction that's fundamentally different from an outdoor running experience.

Differences between over ground and treadmill running are easily observed once they are realized. This can be observed at any health club even with a small sample of runners. First, the observer will note that runners position their body very close to the front rail of the treadmill. From there, running differences can be observed vs. more natural outdoor running. Rather than letting shoulders and arms relax and move freely—with arms at about a 90 degree angle and hands practically brushing by the “pockets”—runners at the front rail of a treadmill cock their shoulders and position arms high and at a tight angle, like a boxer. Meanwhile, the media console is often between waist and chest high, far below the area that's anywhere from a point fifteen yards (e.g., fourteen meters) on the road ahead or the horizon line that runners should focus on for proper form. As a result of the constraints of current treadmill formats, runner's hip motion, footfall and stride must also be adversely affected by the lack of proper motion in his/her torso and upper body. Various research proves that out, having measured shorter strides and differences in ground reaction forces, for example.

Altogether, these factors resulting from the format of current treadmills challenge comfort, compromise form, and increase a likelihood of injury in a sport that already suffers from a high injury rate.

Various treadmills have been proposed and made which provide alternative softer treadmill surfaces to make them

2

more comfortable. While these options may drive buying behavior, one must realize that the predominant running surface, the one for which running shoes are designed, is pavement. Meanwhile, treadmill manufacturers continue to do more to emphasize the front component, by adding media systems with entertainment and more programming options.

In other non-fitness treadmill categories, specialty treadmills include those designed for a treadmill desk application. These treadmills are generally shorter than running treadmills and have different motor types built for walking speeds up to about four miles per hour (MPH) or approximately 6.5 kilometers per hour. The TreadDesk™ product is one such example which also does not include any side-rails. Another approach indicates the aspects for desk mounting and safety in a treadmill walking scenario.

In the medical area, the GE CASE Exercise Testing System includes a treadmill that is designed to be used in conjunction with physiological monitors and a live operator who uses a remote monitor to monitor the patient and increase belt speed in order to push the patient to an 85% threshold or higher for a period of time sufficient for a stress test.

**SUMMARY OF THE INVENTION**

The inventor recognizes that a barrier to an improved treadmill experience is the influence the treadmill structure, particularly the front rail and its electronic component, has upon the user's form.

To this extent, the inventor recognizes a need for an exercise treadmill which: (1) provides features for positioning the user at or just forward from the lengthwise (longitudinal) center of the platform; (2) allows the user free motion, for example to swing arms and stride as he/she would normally on an unconstrained surface; (3) encourages eye positioning to favor an outward rather than downward or outward gaze; (4) provides a simpler means than pressing a button in a membrane control panel of adjusting speed and incline; and/or (4) provides constantly variable pacing controlled by the user's position. The present invention aims to address one or more of these issues and/or one or more other deficiencies of the prior art by, for example, providing a treadmill with no front rail, modified controls, physical accommodations of the treadmill structure, and/or sensor configurations, which provide one or more of the advantages described herein. Embodiments can provide a motor or leg powered/resistance moderated experience and/or a virtual reality experience, where the open ended and/or other traits designed to center the runner are advantageous to a virtualized running or walking experience.

A first aspect of the invention provides a treadmill comprising: a platform; a belt located around the platform; means for rotating the belt around the platform to create an endless surface on which a user exercises; a first side rail extending along at least approximately all of a first side of a usable area of a surface of the platform; a set of user controls positioned on the first side rail; and a front structure comprising a ramped surface, wherein the ramped surface covers a front non-usable area of the surface of the platform and is configured to direct a foot of the user onto the belt in response to a strike by the foot during use of the treadmill, and wherein the front structure is out of reach of the user while the user is exercising on the usable area of the surface of the platform.

A second aspect of the invention provides a treadmill comprising: a platform; a belt located around the platform; means for rotating the belt around the platform to create an